

# PATENT SPECIFICATION

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## DRAWINGS ATTACHED

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## (54) AN IMPROVED FLEXIBLE HOSE AND A METHOD OF MANUFACTURING SAME

(71) We, H. K. PORTER COMPANY (GREAT BRITAIN) LIMITED, a British Company, of Forthvale Works, Stirling, Great Britain, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to flexible hose and is particularly concerned with flexible hose of the type having a helically open-coiled reinforcing member in the wall of the hose.

According to the present invention, there is provided flexible hose having a helically open-coiled reinforcing member in the wall of the hose, the axis of the helix formed by the coils of the reinforcing member being co-axial with the longitudinal axis of the hose, and having a helical depression in the external surface of the said wall and between adjacent coils of the reinforcing member, the reinforcing member comprising at least two wires each coiled to the same diameter and pitch, the wires being disposed in side-by-side mutual relationship.

Preferably, also, the flexible hose includes an inner member or liner, an outer member or cover, and an intermediate member bonded to and forming a layer between the liner and the cover, the reinforcing member being embedded in the intermediate member.

An embodiment of the present invention will now be described, by way of example, with reference to the diagrammatic drawings in which:

Fig. 1 is a partly sectional fragmentary side view of flexible hose in accordance with the present invention, and shows layers which together form the wall of the hose, and Fig. 2 is a fragmentary side view of the flexible hose.

In the drawings, flexible hose, generally indicated at 10, has an inner member or liner 11 in the form of a rubber tube which, during the manufacture of the flexible hose, is placed

on a cylindrical former or mandrel 12. First, second and third intermediate members are wrapped successively around the liner 11, these intermediate members being a first fabric strip 13, a layer of rubber 14, and a second fabric strip 15 respectively. Prior to wrapping the second fabric strip 15, a reinforcing member in the form of a pair of metal wires 16 is embedded in the layer of rubber 14 by winding the wires 16 onto the layer of rubber 14 to form an open-coiled helix. The wires 16 are arranged in side-by-side mutual relationship and each wire 16 is coiled to the same diameter and pitch. (In a flexible hose having a 3" nominal bore, a suitable pitch for each coiled wire is approximately 1").

Subsequent to wrapping the second fabric strip 15 an outer member or cover 17 in the form of a layer of rubber strip is applied by wrapping.

An elongate flexible member, conveniently a nylon rope 18, is now wound around the cover 17, the tension in the rope 18 being sufficient to depress the material of the cover 17 and the underlying layers 14 and 15 between adjacent coils of the reinforcing member 16. That is, the rope 18 is wound to the same pitch as the wires 16 and between the coils formed by each pair of wires 16. The diameter of the rope 18 is approximately half of the coil pitch.

The assembly so far described is now subjected to a setting or heat treatment process (in this example vulcanising) so as to bond the intermediate members to one another and to the liner 11 and the cover 17.

When the heat treatment process is complete, the nylon rope 18 is unwound from the hose and the hose is removed from the mandrel 12 leaving the finished hose with a relatively deep helical depression 19 in the external surface of the wall of the hose and between adjacent coils of the reinforcing member 16.

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The present invention is not limited in scope to the above described embodiment and may be embodied in a flexible hose having members made of materials other than those mentioned.

5 For example, the liner and/or the cover may be of a synthetic resinous material or an impregnated fabric or asbestos. The fabric strips 13 and 15 may be of braided, woven or knitted material such as rayon, nylon, cotton, flax or polyester yarn. The reinforcing member may 10 be made of a relatively hard synthetic resinous material.

The number of intermediate layers may be varied, for example two intermediate layers of 15 such as rubber may be used, the reinforcing member being disposed between these layers. The fabric strips may be pre-coated with such as rubber prior to wrapping, the coating forming a layer in itself.

20 It is envisaged that the reinforcing member may consist of three or more wires arranged in side-by-side mutual relationship and helically open-coiled as described. It will be understood that the total breadth of the 25 side-by-side wires must be slightly less than half of the coil pitch.

Flexible hoses according to the present invention may be manufactured to cover a range of nominal bore sizes, a practical range being 30 1" nominal bore to 16" nominal bore.

Compared with previously proposed flexible hoses having a helically open-coiled reinforce-

ing member in the wall of the hose, a flexible hose according to the proposals herein is advantageous in that it displays improved flexibility in relation to maximum safe internal pressure, weight per unit length, resistance to collapse and manufacturing costs.

WHAT WE CLAIM IS:—

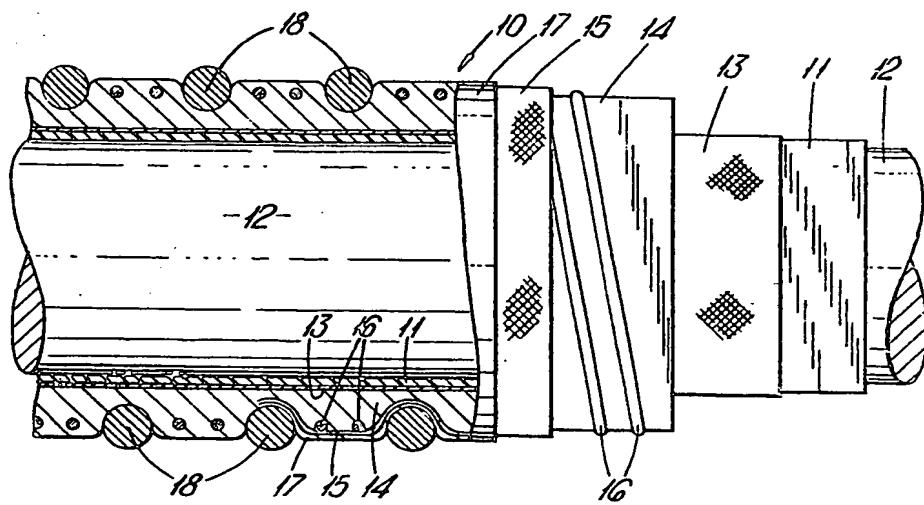
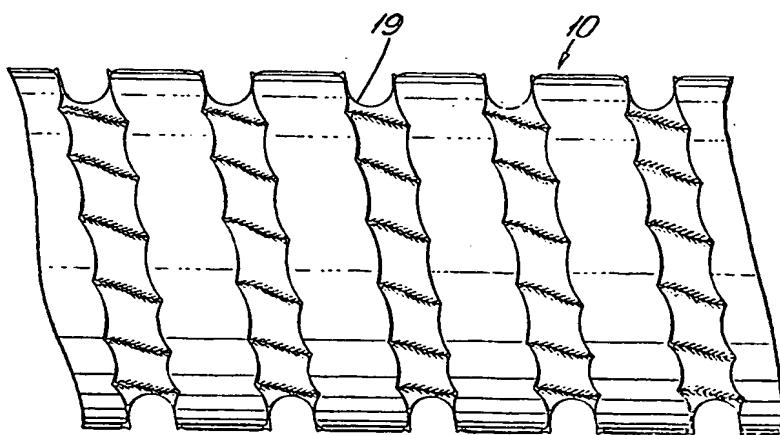
1. Flexible hose having a helically open-coiled reinforcing member in the wall of the hose, the axis of the helix formed by the coils of the reinforcing member being co-axial with the longitudinal axis of the hose, and having a helical depression in the external surface of the said wall and between adjacent coils of the reinforcing member, the reinforcing member comprising at least two wires each coiled to the same diameter and pitch, the wires being disposed in side-by-side relationship.

40 2. Flexible hose according to claim 1 including an inner member or liner, an outer member or cover, and an intermediate member bonded to and forming a layer between the liner and the cover, the reinforcing member being embedded in the intermediate member.

45 3. Flexible hose substantially as hereinbefore described with reference to the drawings.

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Fig.1Fig.2

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